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DARMAT

DARMAT

Courtesy By

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The Disaster Alert Resource Management System aims at facilitating services for prevention of disaster along with providing assistance in designing efficient disaster management plan. It is available at the link dmrajkot.gov.in which is accessible to the officials of Rajkot. The application was developed in collaboration with the Bhaskarcharya Institute for Space Applications and Geo-informatics (BISAG), Gandhinagar. It is a State Level agency By Government of Gujarat to facilitate and to provide services and solutions in implementing map-based Geo-Spatial information system. DARMAT is a GIS & web based system with interactive Decision support system (DSS) in the form of Geo-Spatial Information. It is enabled by Internet Gateway to access the geo spatial data. The system also facilitate to identify and publish information related to disaster management.

DARMAT application works on smart cell phones, too. Mobile alert system for help in broadcasting speedy messages during the time of flood. Using this system and GIS, all the 29 dams of the Rajkot district have been located on the map. All the existing resources and natural features of the district are also mapped using GIS tool. The areas prone to various disasters and villages in the catchments areas of the dams are being mapped into the system using GIS. All major installations are plotted on GIS platform along with latitude and longitude so as to enable easy navigation in future and enable better coordination with agencies like NDRF, army and air force in time of major disasters.

Leveraging upon this opportunity the Rajkot collector office in collaboration with BISAG has devised a mobile alert system which will be of help in broadcasting speedy messages in the form of SMS during the time of flood. Extensive database helps to provide an information about the dams and associated villages that will be affected at the time when a particular amount of water will be discharged from the gates of a particular dam. The alert message can be sent to village representatives like sarpanch, aaganwadi worker, paramedical staff, etc. including collector and other respective officials.

☞ Background:-

Rajkot is considered to be the third advanced district of Gujarat. The district is as industrial hub of the state with 43711 registered industrial units. It comprises of 846 villages and 11 Talukas with population of 37, 99, 770 and area of 11203sq.km. It has 29 dams and Machu, Bhadar and Aaji are the main rivers of the district. The district receives a rainfall of 540 to 600 mm on average every year.

Rajkot District is a main center of saurastra region. It is bounded by Junagadha district in the west, Amreli & Bhavnagar District   In the south, Surendranagar & Kachh district in the Nor Rajkot District is a main center of saurastra region. It is bounded by Junagadh District in the west, Amreli & Bhavnagar districts then east. Its coastline is 90 km. long Area. Rajkot District has 11Talukas (Under Five Subdivisions). Rajkot city is District head quarter and has one of the 8 Municipal Corporation in the state. There are 5 Municipalities named, Gondal, Jetpur, Dhoraji, Upleta and Bhayawadar.

The Climate of Rajkot District can be regarded as one of extreme kind with hot summers & cold. The temperature at Rajkot district headquarters ranges from 43.0 degree centigrade higher in the summer and 12 degree centigrade lowest in the winter.

Disaster proneness

The Rajkot District of Gujarat falls into seismic zone III which is considered to be the "Moderate Earthquake Zone" according to the international standards. One taluka is in zone IV .Being home to a large number of industries, the district is at a risk of various chemical and industrial hazards. To add to this, the gas and oil pipelines also cover a large part of the district. With such a profile, the district is considered to be prone to disasters like flood, earthquake, cyclone and drought. Occurrence of all such disaster has lead to the inception of the idea of using science and technology for prevention and management

of any such catastrophic events in future as well as for efficient use of resources and scientific management.

Rajkot is prone to following disasters:

- Cyclone
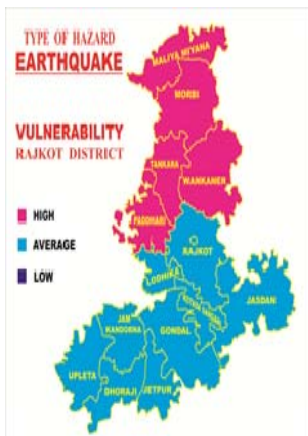- Drought
- Earthquake
- Flood
- Industrial-accidents
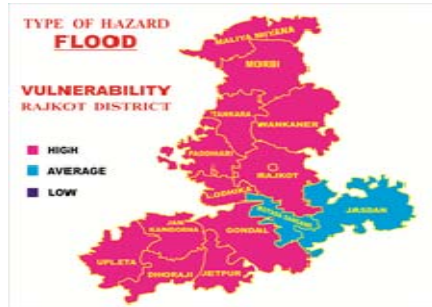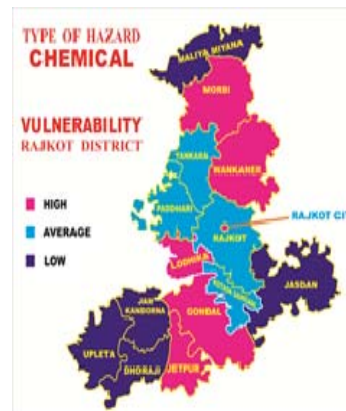
☞ Objective:-

1. To prevent and reduce disaster risk using DARMAT application as broadcasting message in prior to citizen, schools, colleges, hospitals, public places, etc.
2. A mobile alert system to prevent damage to life and property at the time of flood
3. Mitigation of the disaster's impacts by preparation for effective response to disaster to save lives, Minimize loss and property damage, quick recovery from disaster's impacts

☞ Need of DARMAT:-

Machhu Dam disaster in 1979 was one of the major disasters that struck the district and it has also faced severe droughts over the period of years. Occurrence of all such disaster has lead to the inception of the idea of using science and technology for prevention and management of any such catastrophic events in future as well as for efficient use of resources and scientific management.

Need for alert generation

Keeping all these factors in mind, the Collector of Rajkot, Dr.Rajender Kumar, felt the need to have a proactive, comprehensive and sustained approach to tackle such situations and came up with an innovative approach of DARMAT (Disaster Alert and Resource Management by Application of Technology).

The System consists of an extensive mapping of resources on a GIS platform (Geographic Information System) which will have detailed information about all the vital resources that would be required in case any disaster strikes the place. The department has also devised a Mobile alert system and use of ICT which will be helpful in giving alert messages through internet gateway in the time of need.

☞ Situation before the Initiative:-

Before DARMAT was developed, Rajkot collector has lack of trained manpower and lack of dedicated Planning tools with district administration, Lack of resource mapping at a single platform, Lack of awareness in community about major disasters and its impacts, Lack of a consolidated data base about man- power, resources and hazards mapping, Lack of management tools capable enough to handle major disasters, Lack of dedicated communication system which can be used in times of extreme crisis, Lack of ready hazard & resource maps with last mile details of village /habitation level. Due to these circumstances government departments had number of vulnerabilities in action plan against natural calamities, which may mitigate by DARMAT.

☞ Technology:-

This is a GIS & web based system with interactive **Decision support system (DSS)** in the form of Geo-Spatial Information. It is enabled by Internet Gateway to access the geo spatial data. It is enabled with facility to query, identify and publish the useful information for disaster management. User can access as well as able to make query based on various needs of departments. This system maintains the process, store, distribute and improve the utilization of geo-spatial data for decision makers, responders & other stake holders. This application is web enabled with centralized inventory of resources established to minimize response time in any emergencies & also useful to develop mechanism to facilitate the inter-disciplinary approach, involving mitigation preparedness and response functions developed at the administrative level. DARMAT application uses SQL Server to store data electronically.

The three major technologies used in design and development of this entire system are (1) Geographical Information System (GIS), (2) Internet gateway as an interface for use of information Communication technology and (3) Specially designed Mobile Application for real time dissemination of information and alert generation.

There are 29 dams in the district where the alert system works. All the dam in-charge personnel have been given an android based phone where this application has been An Overview of DARMAT in Rajkot District of Gujarat Page 15 installed. An extensive database has been maintained which has stored information about each dam and river flow pattern of all major rivers in the database. The information is about the areas that will be affected at the time when a particular amount of water will be discharged from the gates of a particular dam. As soon as the in-charge selects the dam and the amount of water to be discharged, he has to simply select the dam and water to be discharged after which an automatic message will be generated by the server to the all concerned officers as well as to the selected members from local communities and the affected villages. This also includes the sarpanch and one or two members of the village panchayat, few others such as MDM sanchalak, Anganwadi or ASHA worker and one or two active person from the village community. The MIS of the various village level officials is also maintained and their mobile numbers can be added and removed along with their designation on the link www.dmrajkot.gov.in

☞ Features:-

The feature of the DARMAT are as follows:
- ✓ On selection of specific dam, one can see the areas that will be affected if a particular amount of water (in cusecs) is discharged though the gates.
- ✓ When the appropriate selection is made, the map highlights the areas which are in danger and need immediate evacuation.
- ✓ It classifies the areas as follows:
  - o Need of immediate evacuation : Highlighted in red
  - o Areas that should get ready for evacuation : Highlighted in blue
  - o Areas that need to be alerted : Highlighted in Yellow
- ✓ In addition to that it also indicates the river on the map so that the flow of the river is visible.
- ✓ All the legends are specified for the convenience and clarity of the user.
- ✓ The application offers a range of tools which provide features like zooming the desired location, labeling if required and printing the map.
- ✓ The system though GIS has mapped all the required information that will be helpful for proper mitigation and management of disaster.

✓ The Information has been divided into following heads:

- **Administrative Boundary:** This head defines all the boundaries of the Rajkot district by selecting option like district – wise boundary of the corporation, nagarpalikas, district head quarter, taluka head quarter and all the locations with settlements. The legends are properly specified for each of the categories.

- **Infrastructure:** This category shows on the map, the infrastructure related information of the Rajkot district. One can see the railway lines, road routes, airport, helipads and gas and oil pipelines of the area. The pipelines of GAIL, GSPC and GSPL are differentially indicated for better clarity. The information can help in finding alternate routes in case of any catastrophic situations and taking appropriate actions. The information about the exact location of the gas and oil pipelines will help in detecting hazardous areas, leaks in any and take necessary actions timely.

- **Vital Installations:** The vital installation like airports, nearest ports to the district area, government officer in various talukas, radio stations, Doordarshan kendras, major industrial installations including MHU units, electricity substation are clearly indicated on the map of the district. Information regarding mobile towers and telephone exchanges is also added to this database and is updated on annual basis. All major installation are plotted along with latitude and longitude so as to enable effective communication plan in times of disaster and enable the administration in a better manner. It will be helpful in speedy communication as and when required to the desired areas.

- **Natural resources:** Under the dead, the river flow of all the rivers flowing though the district is extensively indicated. It will be helpful in gauging the risk the surrounding areas may have in times of disaster like flood, earthquake etc. The river flow pattern is studied at different levels of discharge of water from dams and all villages in the downstream are classified based on its flood proneness.

- **Amenities:** During unfavorable situations, it is necessary that one should be aware of the location of the basic amenities and facilitation centers for proper management. The GIS helps in specifying those under the following heads.

  o **Health:** Indicates all the Primary Health Centers (PHCs), Community Health Centers (CHCs), Information about the location of ambulances, blood banks and hospitals. The information can prove to be vital in times of accidents and disaster as the health amenities can be mapped and timely help can be provided to the needy.

  o **Schools:** In times when there is a need to evacuation or space required for relief camps, it is necessary to have information about the places where such

facilities could be provided. One such location could be the nearest schools to the areas. The head indicates every school on the map of the district.

o **Police Station:** Information about the location of the police stations is required in times when there is additional need of maintenance of law and order at times of chaos or panic occurring due to disaster like situation or any other disturbance.

o **Gujarat Infrastructure Development Corporation:** The Corporation has set up the major industries of the area. It has offices in almost talukas and can help in contacting the industries in a smooth manner.

o **Water Facility:** By selecting this one can clearly identify the areas where group schemes related to water are not there and where it is present. The whole of district is divided into ted and green parts where red indicates absence and green indicates presence of group schemes.

o **State Transport Depot:** The bus depots of various talukas are indicated to give a fair idea about the inter-connectivity between the talukas by road.

o **Railway Station:** The information highlights the railway station spread across the district for better understanding of the rail connectivity which will be helpful in defining a proper transportation channel during times of disaster.

o **Food Corporation of India (FCI) Godowns:** Mapping of the FCI godowns will be very helpful in the time of disaster as they would serve as the major source of management of food supplied. It will help in efficient coordination for storing and transporting food to the needed locations.

- **Hazards:** It helps in classification of talukas according to the various hazards they are prone to or are at risk. The mapping is done for the hazards like chemical hazards, cyclone, earthquake, flood and drought.

o **Chemical Hazards:** It classifies the map by highlighting the talukas in different colors indicating which of the talukas are at high, average and low risk from chemical hazards.

o **Cyclone:** Similarly for cyclone the high and average risk areas have been mapped.

o **Earthquake:** The whole district is mapped and divided according to the areas falling under high and average risk.

o **Flood:** Average and high risk areas with respect to flood have been indicated.

o **Drought:** The areas prone to average and high risk of drought are highlighted.

o **Affected Village:** The flood prone villages with differentiated highlighting viz. Red for those who need immediate evacuation at times of flood, blue for those who need to get ready for evacuation and yellow for those who will be put on

distinct. All the villages that are in the catchments area of the various dams are also highlighted with their boundaries specified as well.

All the information mapped under the specified heads can also be clubbed together and made visible on the maps with the option of theme selection. This will help in finding the organizational proximity and the interconnectivity which will further help in making efficient management decisions.
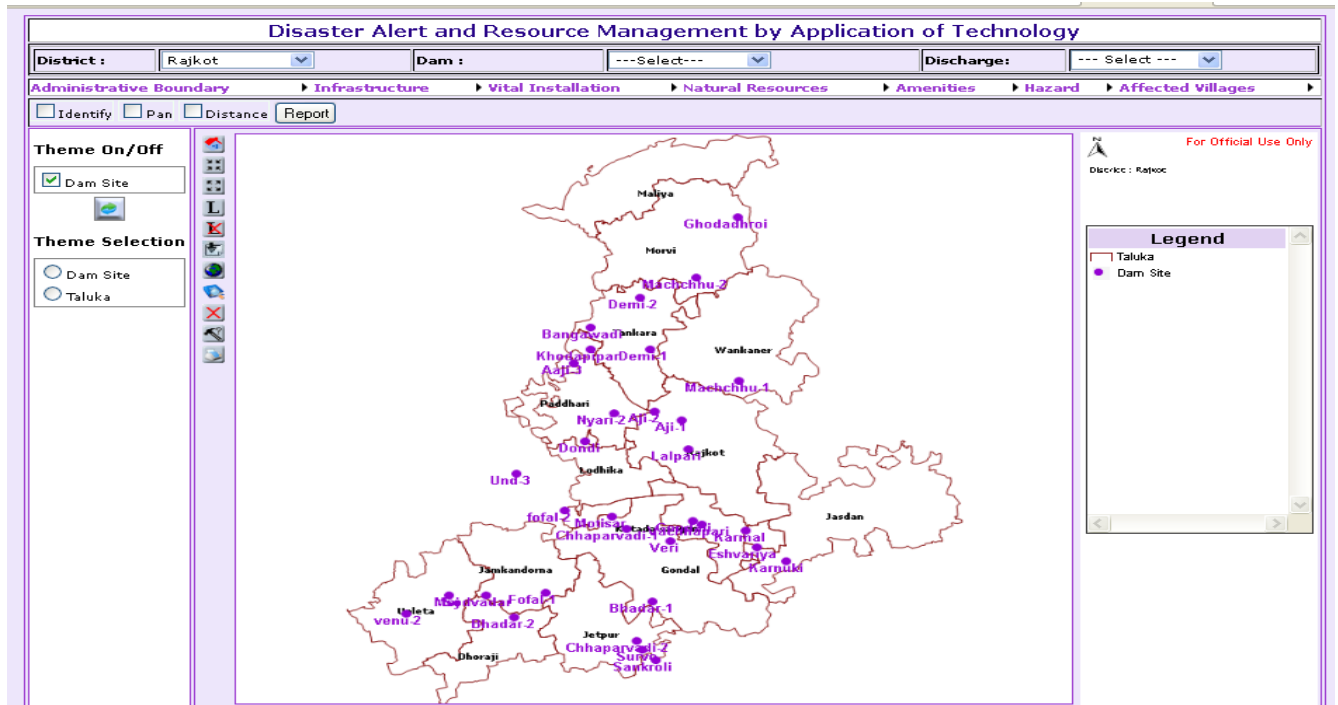

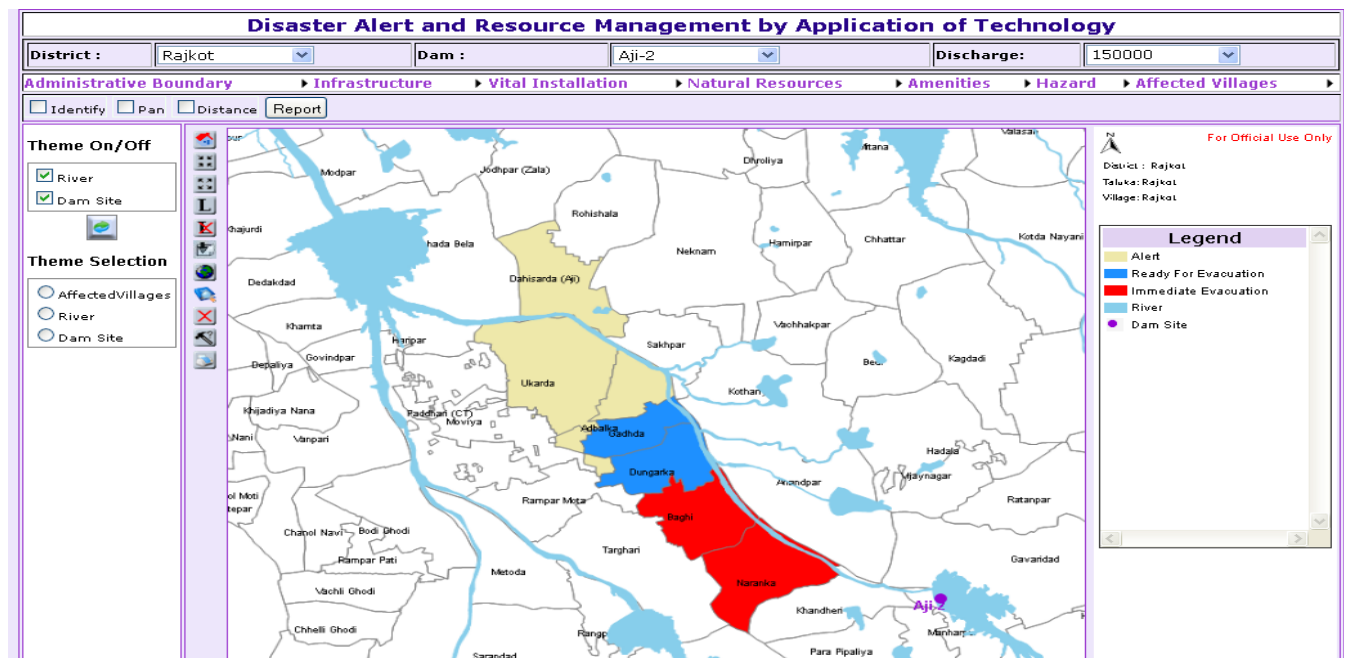**DAM Site:** This page displays the District map of Gujarat State.
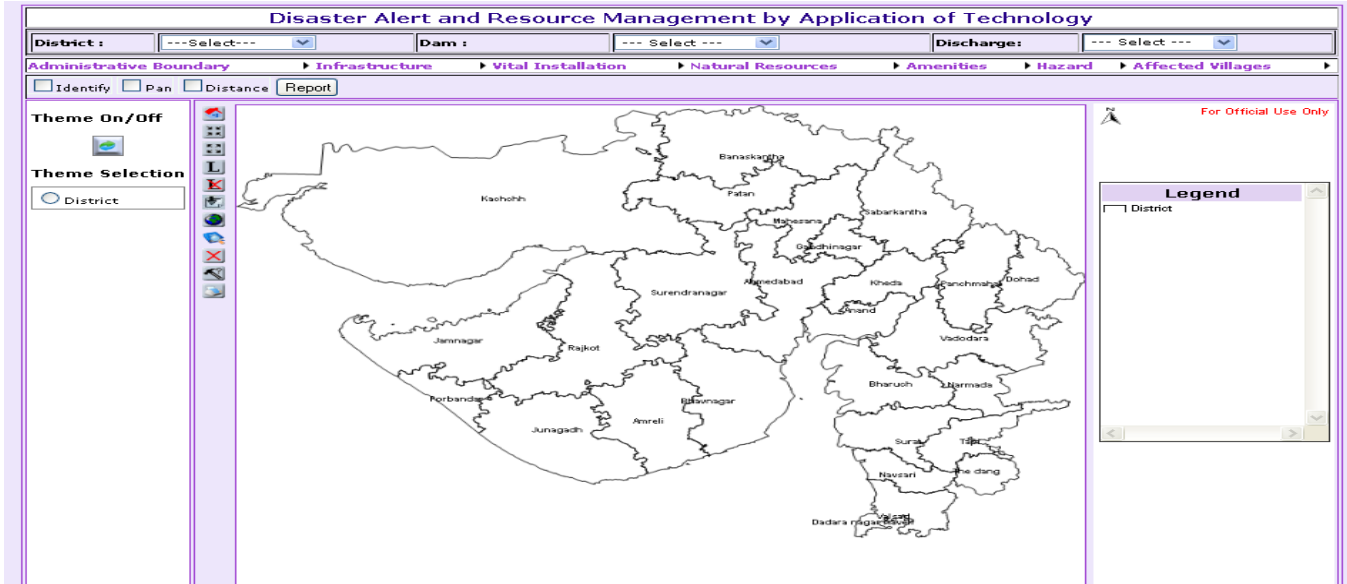
On selecting any District and Dam (i.e. Rajkot and Aji) from dropdown list of District and Dam respectively you will get Dam locations of that district. You, can also navigate from map area by clicking on any District and Dam respectively
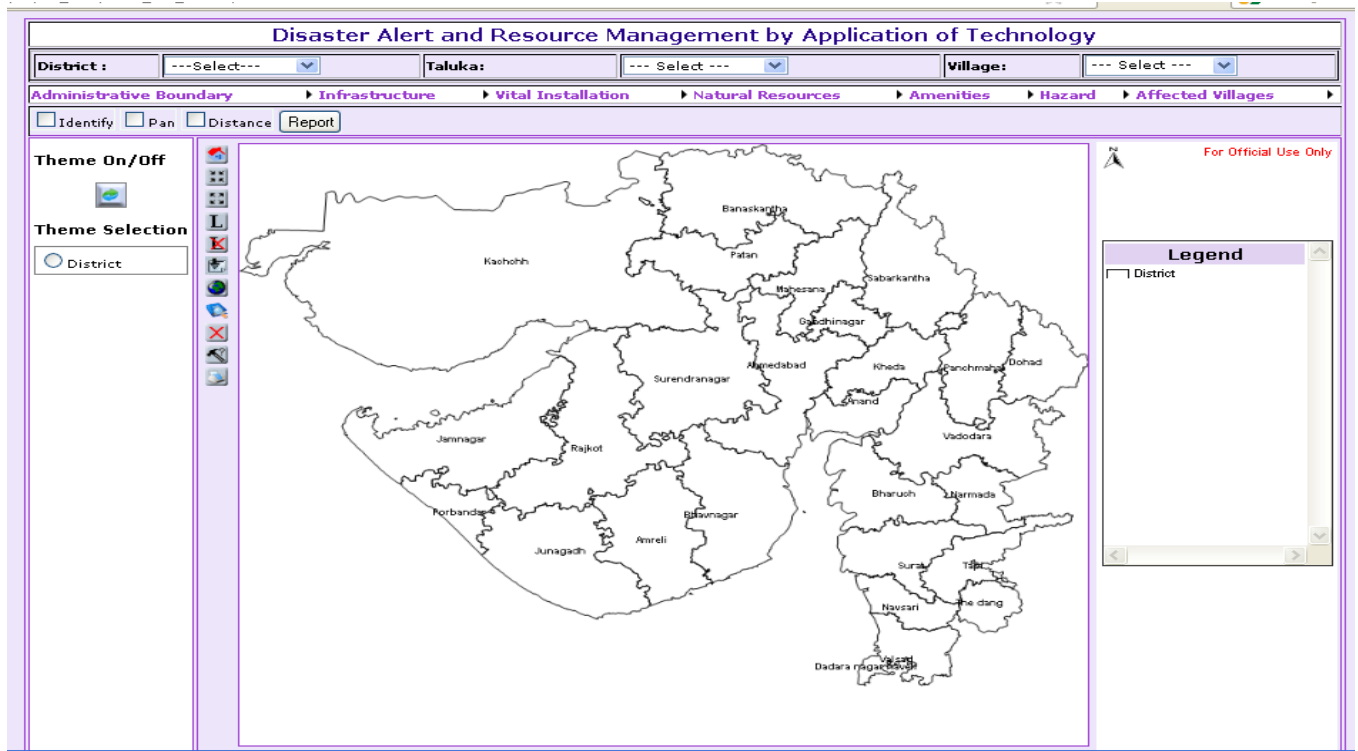

On selecting any dam from dropdown list of Dam site you will get location of Dam. You can also navigate from map area by clicking on any dam.
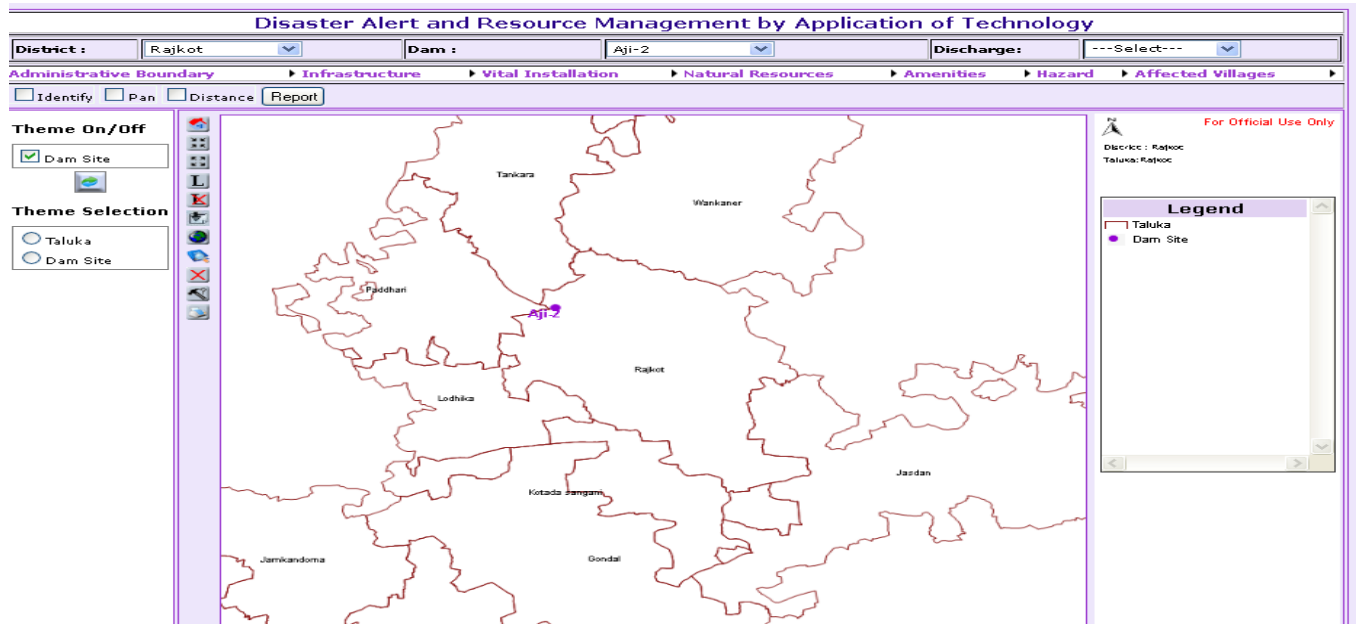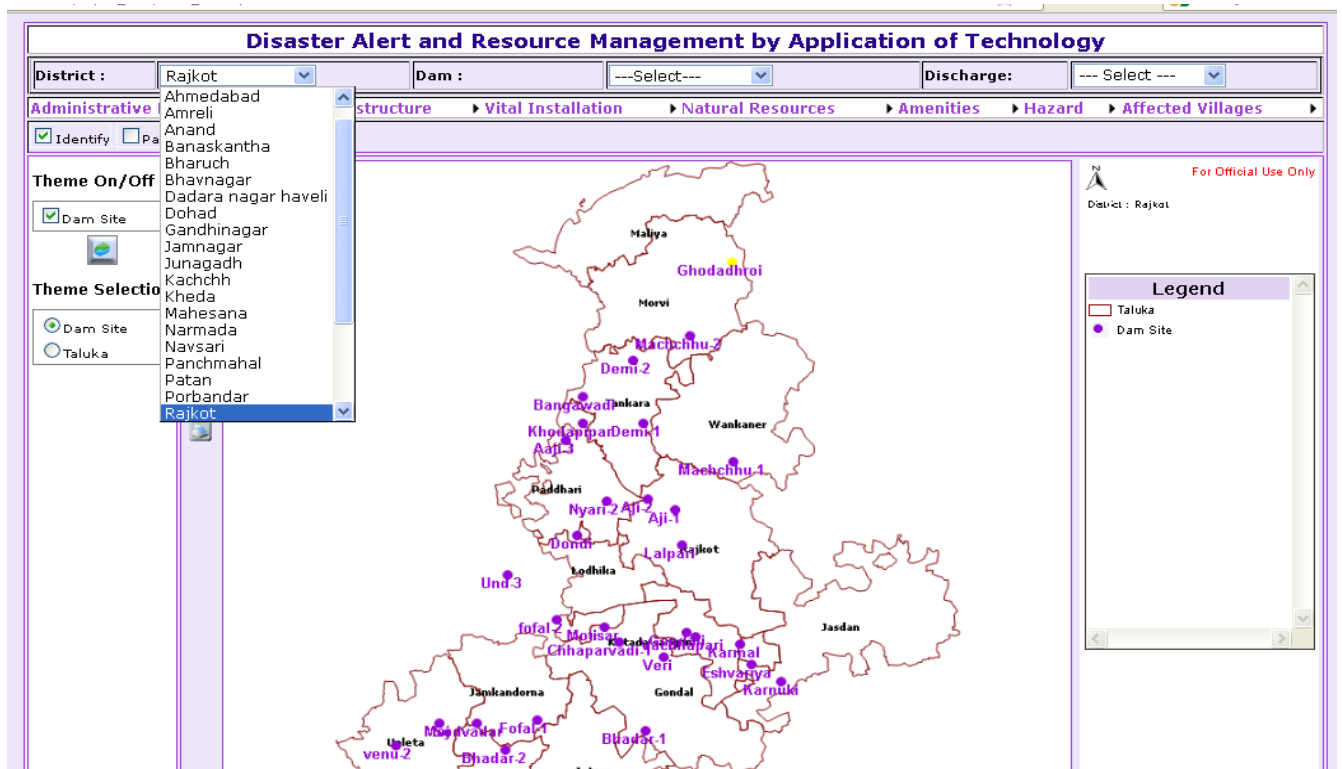
On selecting any discharge from dropdown list of Discharge site you will get affected villages of that dam.

**Revenue Administration:** This page displays the District map of Gujarat state.

On selection of any district from dropdown list of District you will get dam site of the Rajkot district. You can also navigate from map area by clicking on any District.

On selection of any Taluka from dropdown list of Taluka you will get Taluka boundary, Dam location of the Rajkot District. You can also navigate from map area by clicking on Taluka.
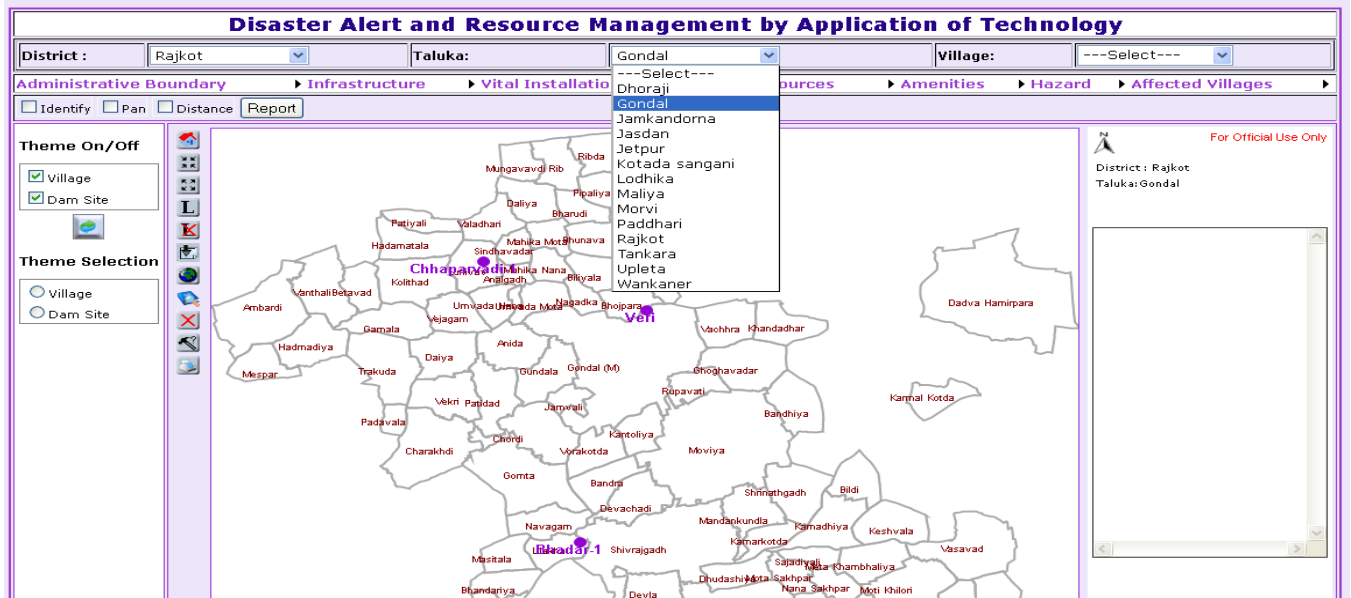
On selecting any village from dropdown list of Village you will get Village boundary of that Village.
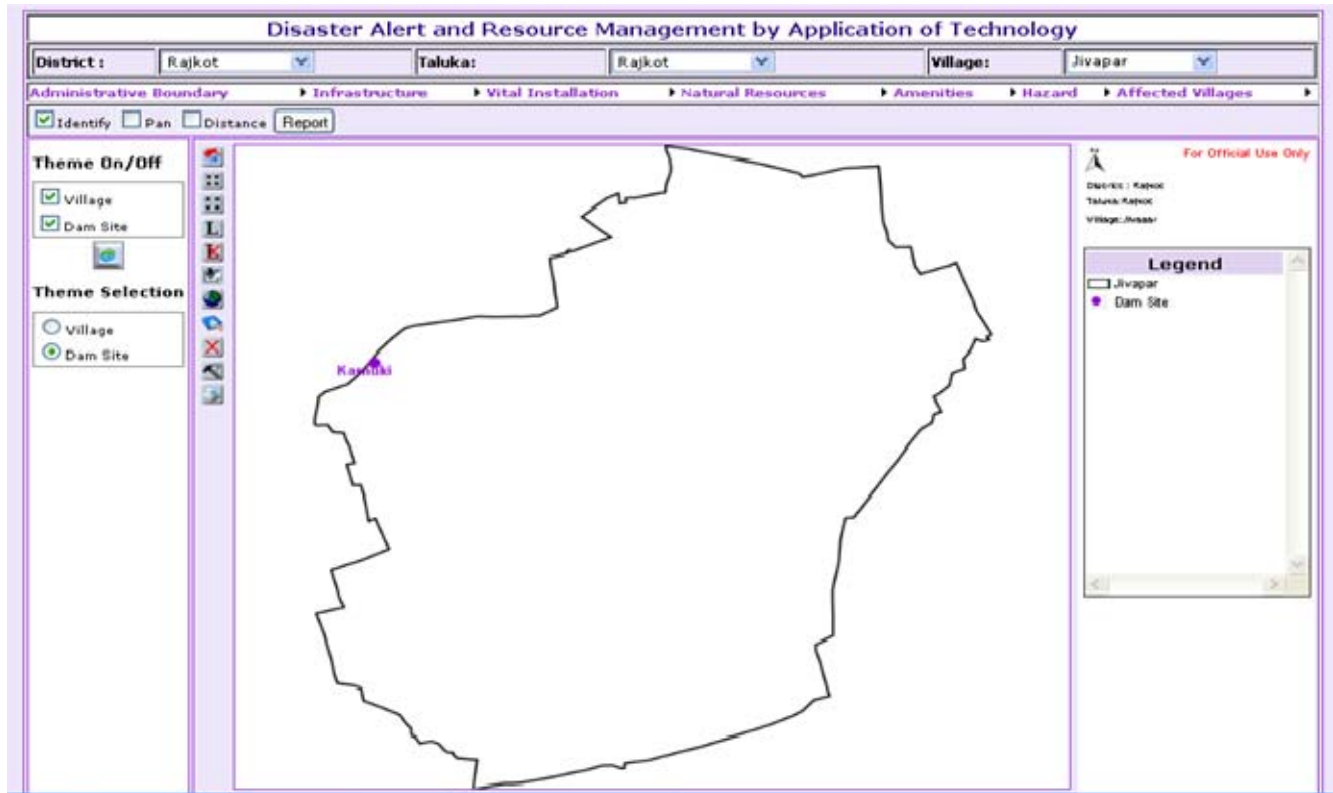
Mobile Alert System

Modern technologies can predict the occurring of disasters with which dissemination of cautionary instructions can be ensured to the people of possibly affected areas. But most of the time difficulty is faced while broadcasting the warning signals of imminent disasters by the concerned officials, agencies and mass communication media at apt time in proper way due to lack of information technologies. Mobile technology especially Short Message Service (SMS) has huge impact in the communication system of modern civilization. Leveraging upon this opportunity, the Rajkot collector office in collaboration with BISAG has devised a mobile alert system which will be of help in broadcasting speedy messages during the time of flood.

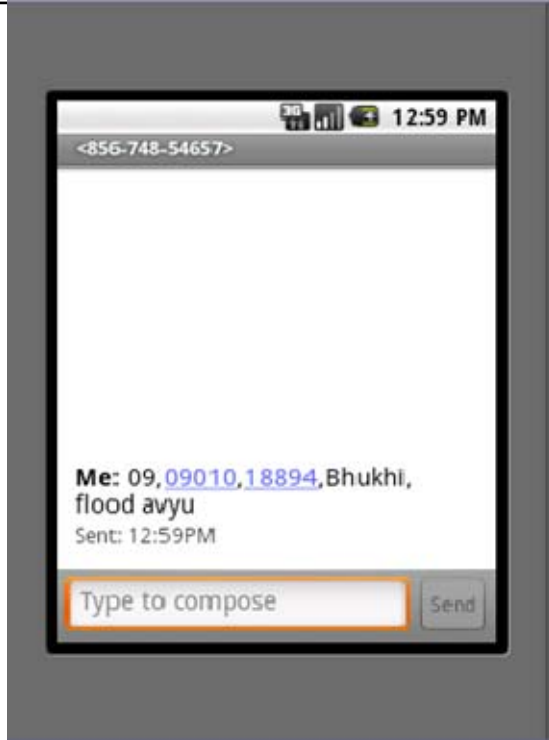### User interface of the Application   Taluka Selection
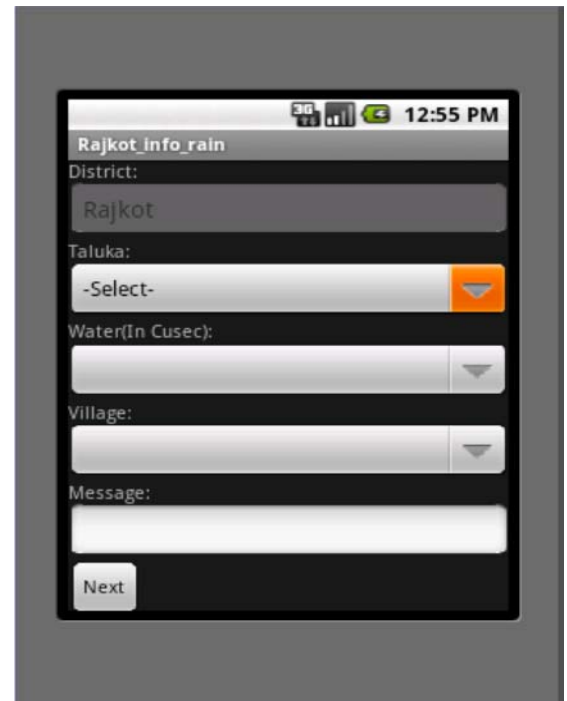
Selection of amount of water (in cusecs) to be released: After the selection of taluka, amount of water needed to be released can be selected.

Next step is the selection of village to be alerted any typing the alert message.

The composed message can sent to already saved contacts including village representatives like sarpanch, aaganwadi worker, government school principal, paramedical staff etc. The massage will also be sent to the collector, additional collector and other required officials.

Selection of amount of water (in cusecs) to be released

After the selection of block, amount of water needed to be released can be selected.

The composed message can sent to already saved contacts including village representatives like sarpanch, aaganwadi worker, government school principal, paramedical staff etc. The massage will also be sent to the collector, additional collector and other required officials.

☞ Benefits:-

The Project is an in-house development, which is founds its utility among the users such as Collector, District Magistrate, citizens, aaganwadi workers, paramedical staff, school principals, etc. The key benefits are as under.

1. This initiative has enhanced the capacity of local administration in handling a disaster situation and help in taking necessary actions
2. Devising efficient management plans to control the situation
3. Help in prevention of the damage or lowering its extent
4. MIS for Mobile alert system
   - Mobile numbers can be added and removed along with their designation on the link www.dmrajkot.gov.in

☞ Sustainability:-

District and Taluka level officers are user of this application so that program is sustainable. User ID provided to all Mamlatdar of District so they can use easily, it can be modified to suit later change that may happen. This is the first initiative of Rajkot Collector office and District Magistrate office towards e-Governance which helping domestic people and thus there is a possibility to change configuration of the application as per requirement of the Gujarat Government however, it may help entire Gujarat. A one line description each of the top three process changes effected as of now as below,

1. Now using this modern scientific tools and techniques the disaster situation can be handled efficiently and major losses can be averted.
2. Using this system through GIS, the mapping of all the required information that will be helpful for proper mitigation and disaster management has been carried out.
3. Use of Communication and dissemination strategy while broadcasting the warning signals of imminent disasters by the concerned officials, agencies and mass communication media at apt time in proper way.

☞ Way Forward:-

The system is an outcome of the proactive approach of the Rajkot district collector office for preparedness to tackle difficult situations in catastrophic times. It is an innovative initiative towards following best practices by tracking down the loopholes and rectifying them, which would subsequently lead to sustainable development. It will help in defining newer and improved principles, norms, standards, policies, processes and responsibilities in governing planning, monitoring and evaluation. It will also help in development of a robust framework for projects and programs with clear indicators, baselines and targets to be achieved henceforth. The system also encourages efficient monitoring and subsequent planning leading to overall growth and prosperity of the community being catered. The model if replicated at the state level will surely bring forth a lot many opportunities to explore in the area of development in times to come.

☞ e-Governance News:-

Department of Administrative Reforms & Public Grievances (DARPG), Ministry of Personnel, Public Grievances & Pensions, Government of India and Department of Electronics and Information Technology (Deity), Ministry of Communications & Information Technology, Government of India have been jointly organizing the National Conference on eGovernance every year in partnership with one State Government since 1997. This year Gujarat was selected as the Partner State to host the 18th Edition of this Conference. The main Theme of the Conference was "Digital Governance – New Frontiers" with "Skill Development & Employability" as Focus Sector.

The Awards of excellence and other awards are given for recognizing the efforts made in eGovernance area
1. Gold Award - Innovative Use of Technology in e-Governance
2. Silver Award - Incremental Innovations in existing Projects

Award	Unique ID	Project Name	Organization
Gold	CAT-3-28-GUJ	Suraksha Setu-Safe City Surat	Office of the Commissioner of Police, Surat, Gujarat
Silver	CAT-4-8-GUJ	e-Procurement	Industries Department, Industries Commissionerate, Gujarat

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